Pulsars

To discuss ...

- What are the blinking lights that scientists discovered in space..?

  -- "Pulsars," or "neutron stars."
  -- The "tombs" of old stars. Each one contains a dead star that has been crushed by gravity into a smooth round ball about 10 miles across.
  First discovered by a young woman, Jocelyn Bell Burnell, in 1967.
  Women have assumed an important role as space scientists.

- The star is crushed by gravity until nothing is left but a "giant atom." If Mt. Everest was crushed the same way, do you remember how big it would be..?

  -- The size of a golf ball. *(But it would contain all the atoms of the mountain. So the "golf ball" would still weigh the same as Mt. Everest..!)*

- Why do they blink..?

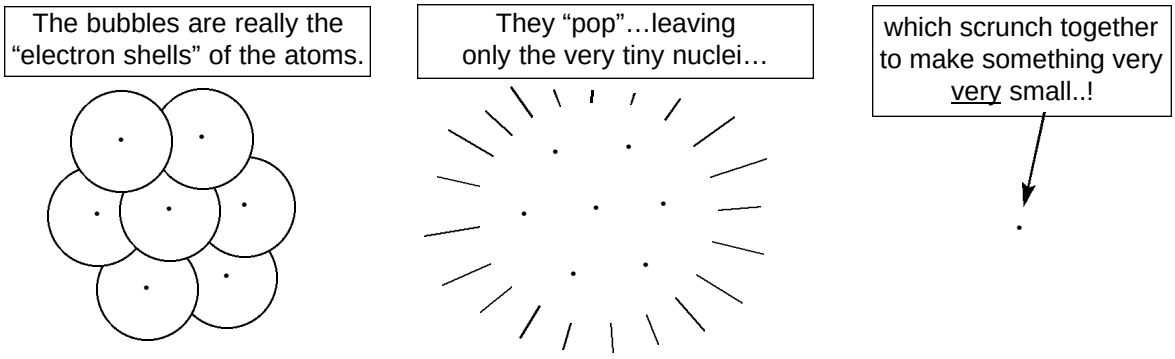
  -- Because they're spinning with beams of light. They look like they're blinking in the same way a lighthouse does if you look at it from far away.

To do ...

- "Listen" to a pulsar on the Web. <u>This is highly recommended</u>! A pulsar's blinking is converted into sound so students can "hear" it. Scroll down to "Pulsar Sounds" at:
http://csep10.phys.utk.edu/astr162/lect/pulsars/pulsars.html

- Mt. Everest squeezed into a **golf ball**..? This really happens if you squeeze something hard enough because atoms are 99.99% empty space. You can think of atoms like soap bubbles. They stick to each other to make things. People, mountains and stars. But if you squeeze all the empty space out of them, or "pop" them, only a tiny bit remains, called the "nucleus." In neutron stars, all the atoms are "popped." Then all the nuclei are scrunched together, making one – giant – atomic nucleus. That's how neutron stars become a "single atom" 10 miles across. (Or Mt. Everest…a golf ball!)

  Draw a simple diagram on the blackboard to show atoms as "soap bubbles"...



(NOTE: "Popping the bubble" of atoms is not easy. Nothing on earth is strong enough to crush Mt. Everest into a golf ball. Only the enormous gravity of a collapsing star is powerful enough to do it. So, you would have to put Mount Everest on the surface of a neutron star to see its atoms "pop," shrinking it to golf ball size..!)